INAUGURAL LECTURE

UNIVERSITY OF MALAYA

Making Diagnosis or Solving Problems

eorge
earch Imaging Centre
University of Malaya Medical Centre
Kuala Lumpur, MALAYSIA

24 September 2014

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Inaugural Lecture

Professor Dr. John George
University of Malaya Research Imaging Centre
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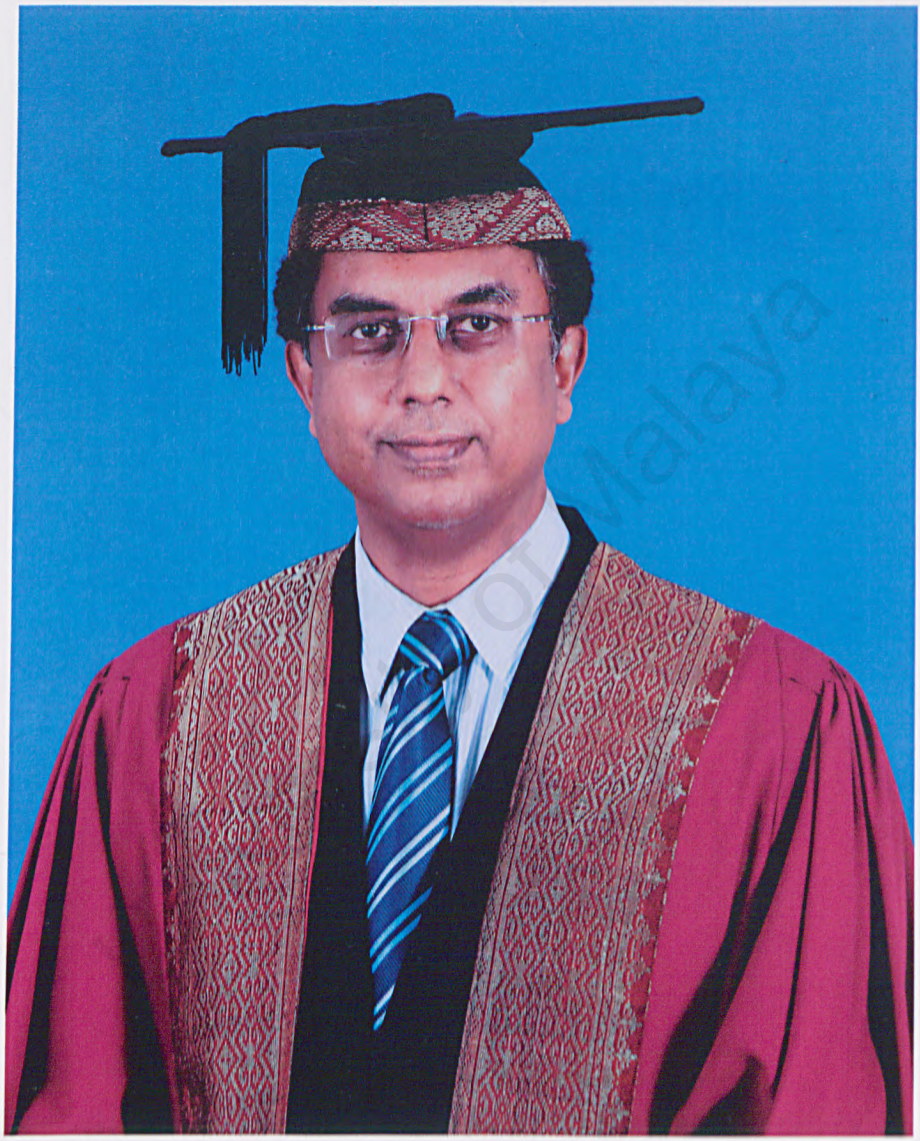


Professor Dr. John George
University of Malaya Research Imaging Centre
University of Malaya Medical Centre
Kuala Lumpur
Malaysia

Synopsis

Making Diagnosis or Solving Problems

This talk should be of interest to everyone who wants to make a difference to this world by not just making diagnosis alone but by solving problems.

The talk will initially concentrate on how Professor George's research and publications in Radiology has made a difference to solving problems in the Radiology community. Much of the research done was a result of a question or challenge posed to him to solve a problem in Radiology or Orthopaedic practice.

His problem solving skills relate not only to Radiology but to his role as Chairman of Government Doctors. His papers and presentations to the Government led to the approval of the request for in-house private practice for specialists in Government and thus forming the basis for the realisation of the University Malaya Specialist Centre. Several white papers on National Health Reforms and National Insurance were also submitted and some suggestions have been implemented or are currently on trial.

In the conclusion of the talk, Professor George will elucidate on the algorithm he uses to successfully aid in problem solving and not just making diagnosis as so many do and criticise. The key ingredients for this success will be shared.

Thank you Chairman for your citation of my biography which has been done so eloquently.

Thank you VIP guests, Dean, Vice Deans, Colleagues and Associates for gracing this occasion and sparing your time to attend this special occasion in my life.

First of all, I would like to thank Almighty God for giving me this privilege to stand and share my life experiences with you in this Syarahan Perdana related to this topic. He is my source of strength and comfort my entire life.

This talk is dedicated to my father Dr Benjamin George who has ensured he provided a solid base for me to succeed in many ventures in my life. His honesty in sharing success and failures in his life and his fortitude to face the many challenges in his life has been a source of inspiration to me.

My mother Thankamma Benjamin has also been a pillar of support in prayer and dedication of my life that it would be of service to the country and people of Malaysia and to the world and I feel to some extent it has achieved what she has desired. She has never prayed for riches or fame for me but God has been gracious to provide me with incredible adventures and positions that have gained me both with the support of family and colleagues to whom I am eternally grateful. It has been a very exciting life of ups and downs and never a dull moment as I was thrown into positions of leadership at various levels that allowed me to solve problems at international, national and University level.

I would also like to extend special appreciation to my lovely wife, Sarah George who has been by my side through thick and thin. She has been a constant source of support and encouragement. Not forgetting of course my two daughters, Julia and Nithia George, who have showered me with love and affection.

In a career spanning over 23 years in Radiology, I have had the distinguished privilege of working with some famous personalities in Radiology particularly Orthopaedic Radiology, Government International and National Sports Associations and Institutions, Musculoskeletal Societies, Church and Para Church organisations. The key personalities

include Dr Stephen Golding in John Radcliffe Hospital in Oxford, Professor Dr Donald Resnick, Orthopaedic Radiologist in Veterans Hospital San Diego, Dr Samuel Doraisamy, the Head of Radiology UM who insisted I join UM as a Lecturer after learning about my MRI experience and Dato Dr Ramlan bin Aziz, who has supported me as the Associate Radiologist at the National Sports Institute.

I would like to share today my topic on "Making diagnosis or solving problems" and share my life experiences in this area which I hope using examples from my real life experience and my conclusions will assist all those present to contemplate whether we are "Making diagnosis or solving problems".

"Everyone who achieves success in a great venture, solves each problem as they came to it. They helped themselves. And they were helped through powers known and unknown to them at the time they set out on their voyage. They keep going regardless of the obstacles they met."
-W. Clement Stone-

I would like to start my journey by sharing my experience with relation to my practice as a Sports Radiologist.

I realise in my practice that many a time an MRI or Ultrasound scan may lead to a report with many findings and if I reported all the findings that the report may not necessarily be helpful to the orthopaedic surgeon or sports physician to address the current problem the patient is facing.

In other words there is a need to state the "RELEVANT DIAGNOSIS" that is causing the current problem to the patient.

A lot of the research that I have been involved in also is a result of a question posed to me by a physician or surgeon and then taking up the challenge to address such an issue.

Let me share some examples with you:

Example 1- a case diagnosed by Sports Physician to be patellar tendon tendinopathy but investigation showed Infrapatellar bursitis. Early confirmation by ultrasound scan saves the patient weeks of inappropriate therapy.

Example 2- Patient with generalised pain the knee and thought to be related to an ACL tear but MRI showed presence of synovitis and final diagnosis was pigmented villonodular synovitis.

What do these two cases demonstrate ?

A tentative diagnosis is made and the patient could continue being managed for weeks for an incorrect diagnosis before an appropriate investigation solves the problem.

The physicians skill in knowing when to refer a patient to for an appropriate investigation or learning to do screening examinations using ultrasound can result in a quicker, more accurate diagnosis.

Sometimes problem solving is as a result of a request by a physician who is facing a particular problem and asking the radiologist to solve it . This has been a very interesting aspect of my research and I shall share some examples which are now used in current practice as a result of published work and presentations throughout the world.

Continuous research and publications to add new insights, techniques and transfer knowledge.

Some examples of problem solving with original research at UMMC include

a. Diagnosis of anterolateral menisco –capsular tear which may explain joint line lateral joint line tenderness which is not associated with a meniscal tear. (1)
b. Researching cartilage protocols which can detect 1mm cartilage defects and internal cartilage changes before loss of thickness. (Use of CISS 3D sequence Siemens or equivalent). Background research is quite adequate in the literature (2,3,4) but a more simpler and shorter standard sequence which can be used day to day is needed. Two Masters thesis projects dealt with this research and as a result the Constructive Interface in Steady State sequence (CISS) for Siemens machines or similar sequence for other companies is being used currently . (5)

In addition to the above it was found that the CISS sequence was able to solve another problem that Orthopaedic consultants faced and that is detection of femoral condyle of the knee cartilage loss 1mm to 3mm.

Research was done to validate this sequence via two Clinical Masters thesis projects and this sequence and similar types of sequences are used worldwide to detect such small degrees of cartilage loss.

		First Actual Cartilage Thickness Measurement	First MRI Cartilage Thickness Measurement by Trainee Radiologist
First Actual Cartilage Thickness Measurement	Pearson Correlation	1	.805 (**)
	Sig. (2-tailed)		.000
	N	114	114
First MRI Cartilage Thickness Measurement by Trainee Radiologist	Pearson Correlation	.805 (**)	1
	Sig. (2-tailed)	.000	
	N	114	114

** Correlation is significant at the 0.01 level (2-tailed).

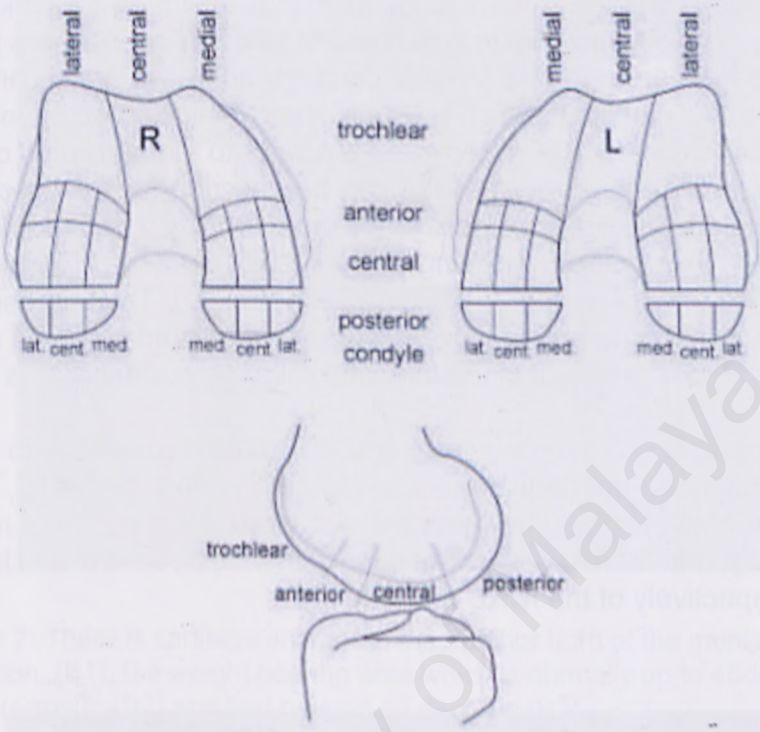
This detection of loss of cartilage using the CISS sequence allows the surgeon to discuss the potential repair of such cartilage damage with the patient prior to the operation.

c) A new mapping system was also derived to help surgeons to locate the areas of cartilage defect. (5)

Translating the correct location of a cartilage defect noted on weight bearing area of Femoral cartilage in a manner that can be understood to the arthroscopist so they understand

An Original Mapping System of the Weight Bearing Areas of the Knee by Prof Dr. John George(with some modification by Dr Masoud Al-Riyami) which matches the ICRS mapping:

Here is the ICRS mapping:



The mapping system we use is easy as it follows the ICRS system and easily understood by orthopaedic surgeons.

The system is based on the appearance of cartilage from the sagittal sequence of a cartilage specific sequence like 3D CISS (Siemens) or Balanced FFE (Philips). In this classification, the outermost sagittal image shows the weight bearing area of the femoral condyle, which is limited by the outer border of the anterior and posterior horns of the medial and lateral menisci. The posterior femoral condyle forms the non weight bearing area on this image. These two areas have been designated A2 and A3. A3 is usually correlated arthroscopically by the cartilage beyond 45 degrees of flexion (Figure 3). The sagittal image that first shows cartilage anterior to anterior horn of the menisci reflects the next section. The cartilage anterior to the meniscus is identified as B1 and B2 and B3 (Figure 4) reflects the corresponding areas as A2 and A3, except being more central in the femoral condyle. The next region of interest is the trochlea region of the femoral condyles. In this plane there is no central weight bearing area or posterior region of the cartilage and is identified as

C1 (Figure 5). Therefore in this proposed simple classification, the area 1 refers to the cartilage anterior to the meniscus on the MRI in which the knee may normally have up to 5 degrees of flexion. Area 2 refers to the weight bearing areas of the femoral cartilage and area 3 the cartilage posterior to the meniscus which is usually the cartilage noted beyond 45 degrees of flexion on arthroscopy and posterior to the meniscus on the sagittal views. The patella cartilage can be described as being on the medial or lateral facet of the patella or the median ridge. The tibial plateau cartilage can be identified as being on the medial or lateral tibial plateau anterior or posterior region (T1 and T2 respectively). Thus, a lesion of the anterior half of the lateral tibial plateau would be graded as LT1 and a lesion on the posterior half of the medial tibial plateau identified as MT2.

The orthopaedic surgeons used the ICRS mapping system to point out the location of the cartilage lesion (see appendix). Area 1, 2, 3 (as mentioned above) correspond with anterior, central and posterior region respectively, and area A, B, C correspond with medial, central and lateral region respectively of the ICRS system

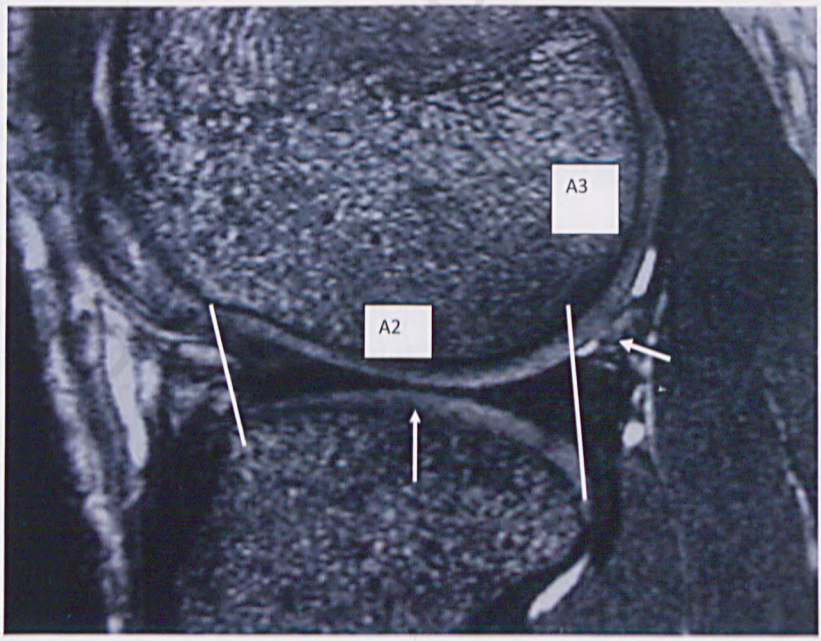


Figure 6: The outer weight bearing area of the femoral condyle (A2), with no cartilage anterior to the meniscus on extension and cartilage more than 45 degrees on flexion (A3)

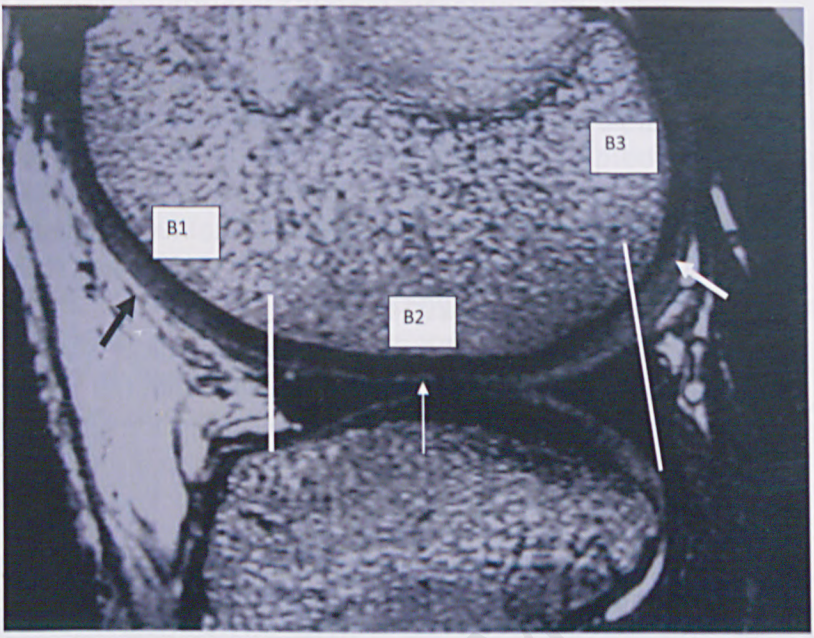


Figure 7: There is cartilage anterior to the anterior horn of the meniscus on extension. (B1), the weight bearing area which is normally up to 45degrees on flexion(arrow) , (B2) and that beyond 45 degrees (B3).

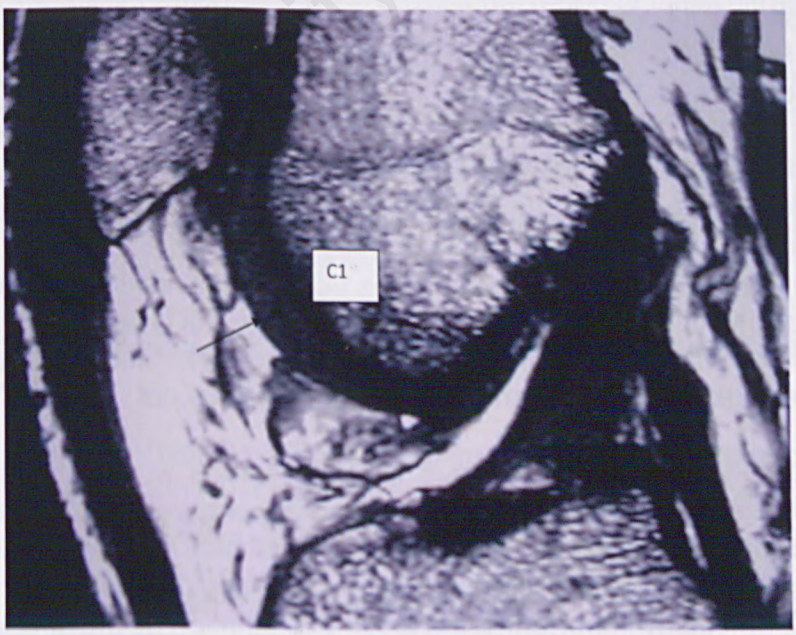


Figure 8: Cartilage in the trochlear region (C1)(arrow) with no cartilage noted posterior on flexion.

(ISI Indexed Conference Proceedings refereed full paper 2014) .

c. Diagnosis of partial ACL tears on MRI - conventional sequences not adequate. CISS 3D sequence(Siemens or equivalent) found to be very useful.
d. Grading of tendinosis and treatment of focal supraspinatus tendinosis with dextrose prolotherapy to hasten improvement of clinical symptoms and function. (Thesis and ISI Indexed Conference Proceedings – Full Paper 2014) (5)
e. Technical adjustment to the way Rheumatological studies of the hands for synovitis are done from longitudinal method to transverse method across MCP joints following thesis study that showed in early RA that synovitis occurs first and is more predominant on the radial and ulna side rather than dorsal or volar side. More reproducible technique as well. (6)

Basic Training in Musculoskeletal Radiology during Residency

In an International Musculoskeletal MRI and Ultrasound Course held in Malaysia with myself as Course Director , homework of actual MRI video cases is given for knee and shoulder examination reveals accuracy of only about 50% in reporting significant pathology including meniscal tears of the knee. When questioned the radiologists with such results all mention being trained in a modality approach where they are attached to the MRI unit doing all sorts of different scans and not attached under a musculoskeletal radiologist for a two or three months.

A good example of such Basic Radiology training is in the Leicester Based Radiology system where the training is by rotations from first to third year in specialty based training. The summary of their training can be found at https://www.eastmidlandsdeanery.nhs.uk/page.php?id=829). Speciality based training is also used in Dubai and website link is as follows: http://www.dha.gov.ae/EN/SectorsDirectorates/Directorates/MedicalEducation/Services/ResidencyProgram/Documents/Radiology.pdf

Additionally, it is useful to have some sessions where the trainee radiologists can join the the orthopaedic clinic or rheumatology clinic to witness the physical examination being done will help in doing stress tests to joints while performing ultrasound and improving diagnostic accuracy. This is particularly important in the ankle examination as the stress tests will help delineate the ligaments such as the CFL much better and avoid erroneous reports

Subspecialty training and Clinical attachments:
This must be done today in a centre with both training in Musculoskeletal MRI and Ultrasound. Gone are the days when one can call themselves a Musculoskeletal Radiologist with just Musculoskeletal MRI training. Musculoskeletal Ultrasound is now widely accepted to be able to accurately diagnose much of the Musculoskeletal pathology especially of superficial ligaments and structures more accurately.

For Musculoskeletal MRI - the use of the correct technology is also important to enable to get the necessary information . For instance the MRI machine should preferably be a 1.5 T or higher specification. It is important to note that not all 1.5 T magnets are of the same quality. One of the ways to assess a good quality MRI is that it is able to resolve the weight bearing cartilage of the knee which is just 3 to 4mm.

A centre where Orthopaedic Surgeons regularly do arthroscopic surgery is preferred and giving feedback to the Musculoskeletal Radiologist helps to improve accuracy.

The training period to learn MSK MRI and Ultrasound for a Clinical Attachment should not be less than 3 months for Clinical Attachment and one year for a proper fellowship. It is important that this time be divided into Observation, doing the provisional report or initial ultrasound of the patient under supervision which is then checked and finally doing ultrasound scans on your own in a second room and getting the Consultant to come and check the scans. Formal assessment should be performed before one is allowed to scan and interpret on their own.

A Clinical Attachment or doing scans without a supervisor or instructor is not beneficial as there is lack of feedback.

Attending Basic and Advanced Course in Musculoskeletal MRI and Ultrasound.

Continuous Professional Education requires individuals to attend course preferably which don't just have lectures but also run actual cases of all common pathology which should not be missed.

In the Penang MSK MRI and Ultrasound course of which I am Course Director (www.penangmskrad.com) MSK MRI videos and MSK Ultrasound Videos demonstrating the MRI and Ultrasound principles learned during

the lectures are shown to bring home the salient points. This course is certified by the Royal College of Radiologists UK and approved for points towards European Society of Skeletal Radiology Diploma in Ultrasound. (Table 1)

The courses should not have more than 1 demonstrator to 6 pax at one ultrasound table and the ultrasound machines should be of high resolution. There should be at least 2 hours of hands on musculoskeletal ultrasound time per joint or forearm etc. If possible Video CD of the procedures showing how each region is done should be shown to the delegates before the ultrasound session and the common pathology after the practical session so the delegates can recognise the normal images and planes before being shown the videos.

Course materials will usually include some of the up to date articles references and E books and powerpoints which have been released by speaker for open usage.

The emphasis in the lectures and practical sessions during the course will be on the types of questions that should be asked, how to select the right imaging modality, showing the simple stress tests and best positioning for detection of abnormalities.

Musculoskeletal Ultrasound allows one to examine the exact point of point tenderness and to look at the underlying structure that is the source of the current symptoms of the patient and get this treated. A good intensive course helps elevate level of knowledge in a specific field and addresses the problems of gaps in knowledge. Here is a testimonial of the annual MSK MRI and Ultrasound Course in Penang.

TESTIMONIAL

Simply Great.

"Simply great. The MSK US & MRI course held in Penang/ Malaysia 2012, organized by Prof John George, was great as far as the content, duration, experience & way of teaching is concerned. Prof J George himself is very humble & cool, he tried his best to teach us in a very smooth & academic way. I have never attended such a good knowledgeable & extensive course of MSK radiology. We were three from Pakistan, who attended the course. This is true that course was really above our expectation.

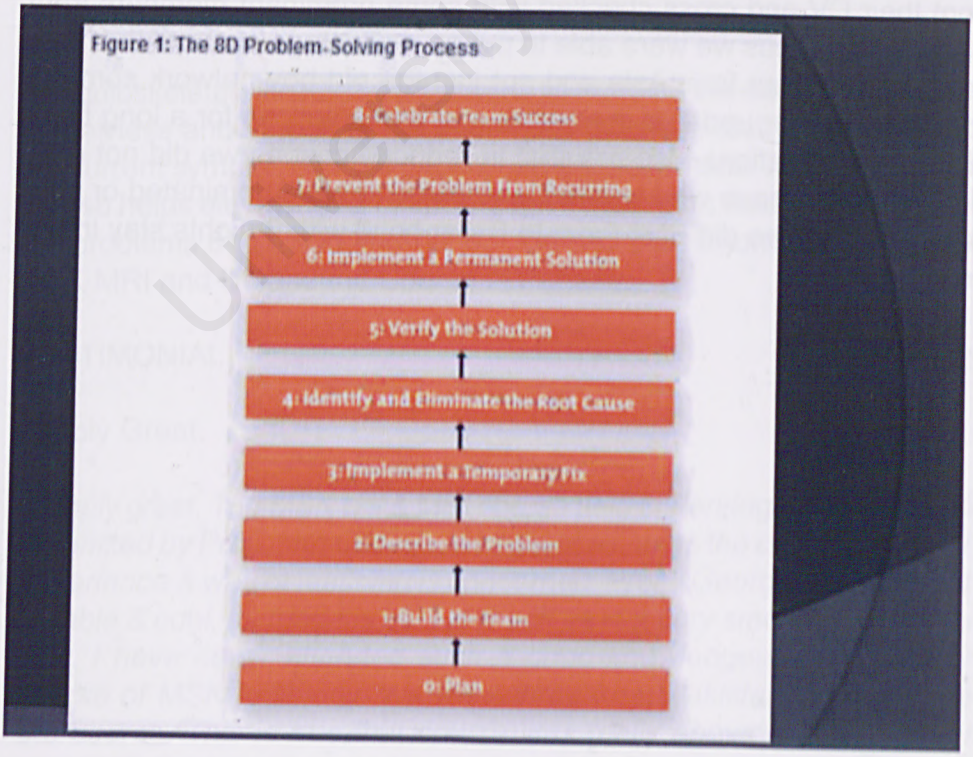
There were MSK teachers from four different countries, like Dr James from Australia, Dr Tony from Singapore, Dr Daniel from Indonesia & Dr Nazrila from Malaysia, but the whole story rotated around respectful Prof, J George. He taught us in a very practical way how to incorporate the radiological findings with clinical sign & symptoms. I would strongly recommend my colleagues to attend this course next year in 2013. At last not the least, Malaysia itself a very beautiful country to visit. We enjoyed there a lot, visited Langkawi, Penang & Kuala Lumpur. I am very thankful to Prof.George for his kind response to us from beginning of registration till the end of course."

DR M KASHIF SHAZLEE
MCPS,FCPS,VIR CONSULTANT
Karachi, Pakistan

Apart from Courses, large international conferences can also help to foster education and networking. At the 13th Asian Federation of Sports Medicine meeting in Kuala Lumpur, as Chairman of the Congress apart from the plenary sessions reserved for Exco members for the AFSM, I opened invitations to all member countries to nominate their best national speakers and also for speakers to nominate themselves with justification from their CV and cross checked with some prominent members from their country. Thus we were able to put on main stage some of the most talented speakers from Asia and not just the old boy network some of whom had never updated their work and presentations for a long time. These self-invitations also resulted in reduced cost as we did not offer flight fares for those who wanted to speak and were nominated or self-nominated but we did host them to 5 star hotel with 3 nights stay in the heart of KL.

The 16th British MSK Ultrasound Course	Oxford (UK) Sept 15-17, 2014	Contact: **Gemma.Haynes@ouh.nhs.uk**	1
The 5th Interdisciplinary Musculoskeletal Ultrasound Course	Vienna (AT) Sept 25-27, 2014	Contact: **us-course-vienna@meduniwien.ac.at**	1
7th IDKD Intensive Course in Greece Musculoskeletal Diseases	Athens (GR) Sept 25 – 28, 2014	**www.idkd.org**	2
Musculoskeletal Erasmus Course of MRI (Comprehensive Course)	Porto (PT) Sep 29-Oct 3, 2014	**erasmus.msk.porto14@gmail.com**	2
The 7th Musculoskeletal Ultrasound Intervention Course	Hilton Hotel, Bath (UK), Oct 6-8, 2014	**www.stlukesradiology.org.uk**	1
ESOR Galen Advanced Course on MSK Cross-Sectional Imaging	Amsterdam (NL) Oct 30-31, 2014	**www.esor.org**	1
Postoperative Imaging, SSSR (German)	Baigrist (CH) Nov 1, 2014	see the **programme flyer**	0.5
Oswestry Spinal Imaging Course	Shropshire (UK) Nov 5-6, 2014	**www.orthopaedic-institute.org**	1
International Radiological Symposium Sports & Arthritis	Wroclaw (PL) Nov 7-8, 2014	**mskradiology2014.pl**	1
Musculoskeletal Ultrasound MSUS comprehensive course & individual hands-on training	Brussels (BE) Dec 12-14, 2014	see the **programme flyer**	1
The 3rd Musculoskeletal Hands-on Ultrasound Course	Oxford (UK) January 19-21, 2015	**www.stlukesradiology.org.uk**	1
Musculoskeletal Erasmus Course of MRI (Comprehensive Course)	Birmingham (UK) Jan 19 – 23, 2015	**ms1_2015@emricourse.org**	2
4th Cardiff Cadaveric Ultrasound-Guided Musculoskeletal Intervention Course (CCUMIC)	Cardiff (UK) Jan 23-24, 2015	**http://doctorsacademy.org/Course/CCUMIC/Home.htm**	1.5
MSK MRI and Ultrasound Penang Course	Penang Island (MY) March 18-21, 2015	**www.penangmskrad.com**	2
Musculoskeletal Erasmus Course of MRI (Focus on Joints)	Paris (FR) Sept 14 – 18, 2015	**ms2_2015@emricourse.org**	2

Table 1
Steps to problem solving.



Divergent approach is necessary to consider all potential reasons for the current problem based on facts.

Then a Convergent approach to decide the best course of action to start remedial action. (9) Get the right people to form the team to make the relevant diagnosis and solve the problems Must have the relevant experience. Many times the right expertise not used for choosing expensive equipment in hospitals.

"There are people who, instead of solving a problem, tangle it up and make it harder to solve for anyone who wants to deal with it. Whoever does not know how to hit the nail on the head should be asked not to hit it at all". -Friedrich Nietzsche-

ELIMINATE FAVOURITISM – you don't owe people for a lifetime for a return of favour Identify and eliminate the root cause. This is essential.

Find the root cause of the problem. System, Personnel competency and don't make excuses for the problem to continue or persist after a few repeat errors.

Temporary fix. Most problems will not be fully resolved at first attempt and therefore naming it a temporary fix alleviates and blame to any third party. It allows progress to start knowing that ERRORS can and will occur but accepted. Then second round of convergence to address the problems of the temporary fix.

Verify the solution. Ensure that the solution has indeed solved the problem.

Implement the permanent solution. Don't delay to make the changes necessary. Friendship and trying not to hurt someone in the process and thus not doing anything should not be made an issue. Take decisive action and measure outcomes.

Reward those who have proposed and implemented changes that have been successful in problem solving especially if it is a major change with lasting positive effect.

Problem solving- blue print for a New National Healthcare system for Malaysia via MMA. Several papers written by various committees headed by myself or in which I was involved to solve problems for doctors and the

public. One of those is permission from JPA vis Majlis Bersama Kumpulan Professional dan Pengurusan February 2000 for government doctors to do inhouse private practice. The presentation was made by myself as Chairman of Government Doctors MMA at the time.

I would like to end with one unusual request for problem solving. The Asian Football Confederation and FIFA had a problem with overaged players playing the U17 AFC and FIFA U17 World Championships and since AFC headquarters is in Kuala Lumpur I was asked by the Chief Medical Officer of AFC who knew me as a Sports Radiologist if I could help solve this problem. To cut the story short, I proposed using the distal radius fusion(7,8) using MRI in a large study and FIFA Research wing called F Marc agreed to this proposal to be centered in Zurich at Balgrist Hospital to read out 500 MRI scans of footballers aged 15-19 years old with verified birth dates. We found that those with complete fusion of the growth plate of the distal radius that all the players were above 17 years of age and this was suggested as an age –doping technique. It is now used worldwide and the overage problems now has been resolved.

Want to change your life and solve your problems and those of others starting today? Say three simple words:

I am responsible.

" MAKING RELEVANT DIAGNOSIS AND SOLVING THE PROBLEM"
Thank you for listening to my Syarahan Perdana. God bless you all.

Acknowledgments:

a) Colleagues in Biomedical Imaging and UM Faculty for freedom to explore and practice as needed to fulfil my dreams

b) Members of SCHOMOS MMA & MMA

c) Exco Members and Members of Malaysian Association of Sports Medicine 2010-2014

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Summary:
Professor Dr John George is a senior member of the Department of Biomedical Imaging at UMMC. He started his career at UMMC on 2nd of February 1993 as a Lecturer and was promoted to Associate Professor in November 1997 and Professor in December 2008. He completed his FRCR in 1991 and then underwent a General MRI Fellowship in Oxford in late 1991 and followed by a Musculoskeletal Fellowship under the World renowned Orthopaedic Radiologist Professor Dr Donald Resnick in 1992. He then held two Locum Consultant Radiology posts in the UK while awaiting his appointment as Lecturer in University of Malaya in February 1993.

His main interest and subspecialty is Musculoskeletal Radiology. He is the Head of Musculoskeletal Radiology at UMMC and is also world renowned for his research and also contributions to Musculoskeletal Radiology. He has over 40 peer reviewed publications most of which majority are ISI publications.

His research interests include Knee Cartilage Imaging, Menisco –capsular injuries of the knee for which he holds the original classification of antero lateral meniscocapsular injuries of the knee published in Australasian Radiology, Age determination using MRI which has received numerous citations and is used for prevention of overaged players playing in FIFA and AFC U17 Football Competitions. (FIFA F MARC RESEARCH). The outcome of the last research mentioned is that overaged playing has virtually been eliminated in U17 elite football competitions.

Professor Dr John George is not only active in research but professionally he has advanced Musculoskeletal Radiology in Asia by being the proposer and founder of the Asian Musculoskeletal Society with its pro tem meeting held in Malaysia during the Commonwealth Games in Kuala Lumpur in 1998. Since then the Asian Musculoskeletal Society has been meeting annually in a different country in Asia promoting knowledge and networking amongst the Musculoskeletal Imaging fraternity.

As his active interest is Sports Medicine Radiology, he has been honoured to have served as the President of the Malaysian Association of Sports Medicine for two terms from 2010-2014 during which he took the society to its all time high by hosting the 13th Asian Federation of Sports Medicine Congress in Kuala Lumpur in September 2013. This was a gala event and publicised widely in the local and internet media worldwide.

Professor Dr John George serves the Sports Community of Malaysia also in his field of expertise as a Sports Medicine Radiologist. He has been Associate Radiologist to the National Sports Institute since 1998 Commonwealth Games and has imaged, diagnosed and in some cases offered interventions under ultrasound guidance to thousands of athletes in our country.

He is known as an Expert teacher and is Course Director for the Annual Hands on Intensive Musculoskeletal MRI and Ultrasound Course held in Penang late March annually. (www.penangmskrad.com). This course is attended by those interested in improving their accuracy in reporting Musculoskeletal MRI and performing Musculoskeletal Ultrasound and thus far 4 meetings have been successfully concluded. This course is very popular and the testimonials by those attending including from Foreign countries is outstanding with regards to the course quality and content.

Professor Dr John George has not only been active in his own field of Musculoskeletal Radiology but very socially concerned for the welfare of doctors and Healthcare of the public and has served at various capacities in MMA and most importantly as National Chairman of SCHOMOS, the MMA Government doctors wing. During his time at MMA the following were achieved: Permission was granted for in house private practice in Government Hospitals thus benefitting all grades of hospital staff with increased income. Increase in on call allowances, specialists posts and also Clinical promotions for medical officers in KKM were achieved. Most importantly he was instrumental to put up through SCHOMOS and MMA blueprints for what SCHOMOS wanted in a National Healthcare system. Part of the recommendations of these papers are under trials in KKM or already implemented but he is pushing for National Health Insurance which is able to take care of the expenses not covered presently by the current healthcare system for which all citizens have to contribute to keep the premiums low. He continues to have input into government doctors issues and recently recommended a subspecialist allowance for specialists who have undergone subspecialty training.

EDUCATION:
Bachelor of Medicine and Bachelor of Surgery,
University of Adelaide 1985
Diploma in Medical Radiodiagnosis (DMRD), University of Aberdeen 1990
Fellowship in Radiology, Royal College of Radiologists UK 1991
Fellow of the Academy of Medicine Malaysia.

Skills:
Reviewer for Skeletal Radiology . Highest impact Orthopaedic Radiology journal.

Examiner for Part 1 and Part 2 Conjoined Masters Radiology, Malaysia International Lecturer in Musculoskeletal Radiology over 20 years more than 200 presentations with high accolades for teaching and demonstration skills.

Course Director for Annual International Musculoskeletal MRI and Ultrasound Course in Penang known as the Penang Radiology course.

Awards:
Gold Medal "Meniscal Calculator" MOSTI National Exhibition 2006
Gold Medal "ITEX 2014"

PUBLICATIONS:
Book

George J and Ramlan AA "Case Histories in Joint and Muscle Injury", 2004, 150 pages. ISBN 983-2085-64-0., Kuala Lumpur, Self Published. Commercial website http://ip158.fsktm.um.edu.my/meniscal. First print nearly 1000 copies of this subspeciality book almost sold out (Non-ISI/ Non-SCOPUS Cited Publication)

Chapter In Book
Diseases of the spine: 2003 Chapter 47: 35 pages. Writing solely by John George. Asian Textbook of Radiology. Editors: Wilfred CG Peh and Yoshihiro Hiramatsu Publisher: TTG Asia Media, Singapore Published in 2003 Hard Cover Retail price: US$120 Website: www.asianradiology.com ISBN: 981-04-9053-4. SALES MORE THAN 5000 copies throughout Asia and now electronically.

Article In Academic Journals

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